RESEARCH NOTE

Further Evidence of Humans as Source of *Leishmania viannia* for Sandflies

J Montoya-Lerma[+] , R Palacios, L Osorio, C Jaramillo, H Cadena

Centro Internacional de Investigaciones Médicas-CIDEIM, Apartado Aéreo 5390, Cali, Colombia

Key words: leishmaniasis - human - reservoir - xenodiagnosis - sandflies - Colombia

There is a growing body of evidence supporting the role of humans as a source of Old World anthroponotic *Leishmania* (RD Ashford et al. 1992 *Ann Trop Med Parasitol 86*: 361- 371, R Killick-Kendrick et al. 1995 *Trans R Soc Trop Med Hyg 89*: 477). Circumstantial evidence is consistent with the participation of humans as reservoirs in the transmission of New World leishmaniasis (LM Deane et al. 1986 *Mem Inst Oswaldo Cruz 81*: 133-134, E Rojas & JV Scorza 1989 *Mem Inst Oswaldo Cruz 84*: 29-34). Leishmaniasis has been considered to affect persons working or living mainly in forested areas, where the transmission cycle involved wild animals and sylvan sandflies. However, consequent to deforestation patterns of human migration and urbanisation, both parasites and vectors have proved capable of adapting to the domestic cycle, where other mammals (e.g. dogs, horses, opossums) and even humans may act as alternative reservoirs. If so, indeed this is the case, it would explain the sudden appearance of outbreaks in areas where leishmaniasis has not been previously reported (J Montoya et al. 1990 *Mem Inst Oswaldo Cruz 85*: 119-121), as well as the perpetuation of transmission in established foci (KA Weigle et al. 1993 *J Infec Dis 168*: 699-708).

A pilot study was carried out in CIDEIM using xenodiagnosis in compliant patients, who according to clinical evaluation presented physical signs compatible with cutaneous leishmaniasis, and whose diagnosis was consequently confirmed parasitologically latter. Laboratory bred *Lutzomyia longipalpis*, contained in a pot covered with fine mesh were allowed to feed *ad libitum* on a selected lesion, at least for 15 min. Putatively infected flies were maintained under controlled conditions (26^{o}C and 85-90% of humidity) with sucrose solution. After 5-7 days, flies were dissected and their guts examined for flagellate forms.

Promastigote forms (around 100) were seen swimming in the midgut of flies fed on two of ten patients (Table). In both cases, presence of parasites were concomitant with residues of blood meals. Lesions were less than two months of evolution and their smears were rich in amastigotes.

Our findings clearly show that it is at least possible for sandflies to acquire infections of *Leishmania* from humans, especially from relatively new lesions, when parasites are most abundant at the lesion site. A similar trend has been observed in sandflies fed on dogs (HS Bezerra et al. 1997 *Acta Parasitol Turcica 21*, Suppl. 1: 170), hamsters and opossums (BL Travi, pers. comm.). Since small numbers of flies were fed on healthy areas (data not shown) it is not possible to draw conclusions on whether parasites are concentrated in the ulcers or are peripherally disseminated in the skin. Also, it is possible that infectivity of healthy skin occurs at a different time than at the lesion site. These issues require further examination. The level of infection of sandflies observed in this study was low, possible due to the unnatural association of *Viannia* parasites with *Lu. longipalpis*. An ongoing study will address this subject using *Lu. trapidoi* or *Lu. gomezi*, which have been associated with *Viannia* species in nature. With this approach, we expect to optimise the efficiency of xenodiagnosis as a biological tool.

The real significance of humans as source of *Viannia* species has been not assessed. However, based on the present and previous findings (Rojas & Scorza *loc. cit.*) the plausibility of transmission from humans to sandflies is evident. Understanding of the potential role of humans would have important epidemiological implications for *Viannia* transmission under the changing environmental conditions of many Latin-American countries, especially in areas with presence of a large asymptomatically infected population (MR Siddiqui et al. 1996 *Am J Trop Med Hyg 55* Suppl.: 292, Weigle et al. *loc. cit.*). It is conceiv-

This study was supported by COLCIENCIAS Cod. 2229-04-161-97.

[+]Corresponding author. Fax: +57-266-72.989. E-mail: jamesmon@biologia.univalle.edu.co

Present address: Departamento de Biología, Universidad del Valle, Apartado Aéreo 25336, Cali, Colombia.

Received 31 May 1998

Accepted 8 July 1998

able that asyptomatic carriers may act as source of infection for sandflies as has been demonstrated in canine infection with *L. infantum* (J Alvar et al. 1994 *Ann Trop Med Parasit 88*: 371-378). Moreover, the participation of humans in infection of anthropophilic sandflies would render treatment and compliance of treatment crucial control measures.

TABLE

Characteristics of patients subjected to xenodiagnosis with laboratory bred *Lutzomyia longipalpis*

Patient age	Sex	Time of evolution (days)	Parasite strain isolated from lesion	Exposed flies	Blood fed flies	Positive flies
38	M	50	*Leishmania braziliensis*	12	5	1
16	M	45	*L. panamensis*	20	5	0
20	M	90	*L. panamensis*	20	16	0
59	F	60	*L. panamensis*	20	9	0
61	M	45	*L. panamensis*	20	1	0
54	M	60	*L. panamensis*	22	9	0
27	M	90	In process	40	16	0
34	M	25	In process	44	28	1
31	M	90	In process	20	4	0
24	M	105	In process	30	10	0

M: male; F: female.